

CLAIMS

1. A transparent film for display substrate, containing:
a cellulose ester, and
a plasticizer in an amount of less than 1 percent,
wherein the transparent film is drawn 3 through 100
percent both in a conveyance direction and a lateral
direction.

2. The transparent film for display substrate, described
in claim 1, wherein the transparent film contains a
hydrolyzed polycondensate of the cellulose ester and an
alkoxysilane expressed by the following general formula (1):

General formula (1) $R_{4-n}Si(OR')_n$

(where R and R' represent a hydrogen atom or monovalent
substituents independently, and n denotes 3 or 4).

3. The transparent film for display substrate, described
in claim 2, wherein the hydrolyzed polycondensate
of the cellulose ester and the alkoxysilane expressed by the
general formula (1) are expressed by the following general
formula (2), and a total amount of an inorganic high
molecular compound expressed by the general formula (2) is
less than 40 percent by mass in the transparent film:

General formula (2) $R_{4-n}SiO_{n/2}$

(where R is synonymous with that in said general
formula (1)).

4. The transparent film for display substrate, described
in any one of claims 1 through 3, wherein the transparent

film contains an organic crosslinking agent having a plurality of any of an isocyanate group, a thioisocyanate group and an acid hydride residue, in an amount of 1 through 20 percent by mass so that the cellulose ester is crosslinked.

5. The transparent film for display substrate, described in any one of claims 1 through 4, wherein the number average molecular mass of the cellulose ester is 100,000 or more.

6. The transparent film for display substrate, described in any one of claims 1 through 4, wherein the substituent of the cellulose ester satisfies the following formula (A) and (B):

Formula (A) $0 \leq Y \leq 1.5$

Formula (B) $1.0 \leq X + Y \leq 2.9$

(wherein "X" denotes the degree of substitution and "Y" indicates the degree of substitution by using a substituent containing an alkoxysilyl group).

7. The transparent film for display substrate, described in any one of claims 1 through 6, wherein the degree of substitution of said cellulose ester by the acetyl group is 2.2 through less than 2.9.

8. The transparent film for display substrate, described in any one of Claims 1 through 7, wherein the transparent film contains a crosslinked polymer and the cellulose ester and the crosslinked polymer forms a semi-IPN (semi-interpenetrating polymer network) type polymer alloy.

9. The transparent film for display substrate, described of Claim 8, wherein the transparent film contains the crosslinked polymer in an amount of 5 through 50 percent by mass of the transparent film.
10. The transparent film for display substrate, described in any one of Claims 1 through 9, wherein the transparent film is composed of a cellulose film of which glass-transition temperature obtained by thermal mechanical analysis (TMA) is 180 degrees Celsius or more, and the coefficients of linear expansion in both MD and TD directions are in the range from 5 through 50 ppm/degrees Celsius.
11. The transparent film for display substrate, described in any one of claims 1 through 10 wherein, when the in-plane retardation value at the wavelength of 590 nm is $R_0(590)$ and the in-plane retardation value at the wavelength of 480 nm is $R_0(480)$, the ratio $[R_0(480)/R_0(590)]$ is not less than 0.8 through less than 1.0.
12. A display substrate wherein a moisture proof film containing a metal oxide or metal nitride is formed on at least one of the surfaces of a transparent film for display substrate in any one of claims 1 through 11, and a transparent conductive film is formed on the moisture proof film or on the surface opposite to the surface where the moisture proof film is formed.

13. The display substrate of claim 12, wherein said moisture proof film is mainly composed of silicon oxide.

14. The display substrate of claim 12 or 13, wherein the moisture proof film and the transparent conductive film is formed by applying a high frequency voltage between opposed electrodes under atmospheric pressure or under approximately atmospheric pressure for a discharge, generating a reactive gas in the plasma state by the discharge, exposing the transparent film for display substrate to the reactive gas in the plasma state whereby the moisture proof film and the transparent conductive film are formed on the transparent film.

15. A liquid crystal display using the display substrate in any one of claims 12 through 14.

16. An organic electroluminescence display using the display substrate in any one of Claims 12 through 14.

17. A touch panel using the display substrate in any one of claims 12 through 14.

18. A method for manufacturing a transparent film for display substrate according to a casting film forming method, comprising the steps of:

casting the dope containing a cellulose ester and a plasticizer in an amount of less than 1 percent, onto a casting support member to form a web;

drawing the web 3 through 100 percent both in the conveyance direction and the width direction; and drying the web.

19. A method for manufacturing a display substrate comprising the steps of:

applying a high frequency voltage between opposed electrodes under atmospheric pressure or under approximately atmospheric pressure for a discharge,

generating a reactive gas in the plasma state by the discharge,

exposing the transparent film for display substrate formed by the method of claim 18 to the reactive gas in the plasma state whereby the moisture proof film and the transparent conductive film are formed on the transparent film.

20. The method for manufacturing a display substrate of claim 19, wherein the frequency of the high frequency voltage is in the range from 100 kHz through 2.5 GHz, and the supply power is in the range from 1 W/cm² through 50 W/cm².

21. The method for manufacturing a display substrate of claim 20, wherein the frequency of said high frequency voltage is in the range from 100 kHz through 150 MHz.